Claims

1. – 43. (Cancelled)

44. (New) A substrate obtainable by

i.) depositing on a surface of a substrate at least one plasma monomer from a monomer source wherein during deposition of said monomer said monomer and/or said surface are moved relative to one another to provide a non-uniform plasma polymerised surface; or

ii.) depositing on the surface at least one plasma monomer from at least two spatially separated monomer sources to provide a non-uniform plasma polymerised surface; and

iii.) introducing to at least part of said plasma polymerised surface a binding entity to provide a non-uniform surface formed from said binding entity

wherein the binding entity provides a surface onto which a cell can grow or attach.

45. (New) A substrate as claimed in claim 44 wherein the binding entity comprises a carboxyl or amine functional group.

46. (New) A substrate as claimed in claim 44 wherein the binding entity is selected from the group consisting of cells, metabolites, pharmaceutically active agents, proteins including hormones, antibodies, enzyme, receptor, macromolecules including DNA, RNA, protein fragments, peptides, polypeptides, ligands, proteoglycans, carbohydrates, nucleotides, oligonucleotides, toxic reagents and chemical species.

47. (New) A substrate as claimed in claim 44 wherein the binding entity comprises an immobilised or adsorbed biological entity.

48. (New) A substrate as claimed in claim 47 wherein the biological entity is a protein or protein fragment.

49. (New) A cell substrate as claimed in claim 44 wherein the binding entity interacts covalently with functional groups of the plasma polymerised surface.

50. (New) A substrate as claimed in claim 44 wherein the binding entity is immobilised on the plasma polymer surface.

51. (New) A substrate as claimed in claim 44 wherein the binding entity is chemically linked to functional groups in the plasma polymer surface.

52. (New) A substrate as claimed in claim 44 wherein the binding entity interacts non-covalently with functional groups of the plasma polymerised surface.

53. (New) A substrate as claimed in claim 44 wherein a cell interacts with the binding entity of the plasma polymerised surface.

54. (New) A substrate as claimed in claim 44 wherein the monomer is a volatile alcohol.

55. (New) A substrate as claimed in claim 44 wherein the monomer is a volatile acid.

56. (New) A substrate as claimed in claim 44 wherein the monomer is a volatile amine.

57. (New) A substrate as claimed in claim 44 wherein the monomer is a volatile hydrocarbon.

58. (New) A substrate as claimed in claim 44 wherein the monomer is a volatile fluorocarbon.

59. (New) A substrate as claimed in claim 44 wherein the monomer is an ethyleneoxide-type molecule.

60. (New) A substrate as claimed in claim 44 wherein the monomer is a volatile siloxane.

61. (New) A substrate as claimed in claim 44 wherein the monomer is selected from the group consisting of N-vinyl pyrrolidone, allyl alcohol; acrylic acid; octa-1,7-diene; allyl amine; perfluorohexane; tetraethyleneglycol monoallyl ether and hexamethyl disiloxane (HMDSO).

62. (New) A substrate as claimed in claim 44 wherein the polymer consists of a single monomer.

63. (New) A substrate as claimed in claim 60 wherein the monomer consists essentially of an ethylenically unsaturated organic compound.

64. (New) A substrate as claimed in claim 61 wherein the monomer consists essentially of a single ethylenically unsaturated organic compound.

65. (New) A substrate as claimed in claim 62 wherein the monomer consists of an ethylene oxide type molecule.

66. (New) A substrate as claimed in claim 61 wherein the monomer consists of a mixture of two or more ethylenically unsaturated organic compounds.

67. (New) A substrate as claimed in claim 61 wherein the compound is selected from the group consisting of an alkene containing up to 20 carbon atoms, a carboxylic acid, an alcohol and an amine.

68. (New) A substrate as claimed in claim 44 wherein the polymer is a co-polymer.

69. (New) A substrate as claimed in claim 66 wherein the co-polymer comprises at least one organic monomer with at least one hydrocarbon.

70. (New) A substrate as claimed in claim 44 wherein the monomer is a polymerisable monomer having a vapour pressure of at least $6.6x10^{-2}$ mbar.

71. (New) A substrate as claimed in claim 44 wherein the monomer (s) is/are deposited on said surface in spatially separated dots.

72. (New) A substrate as claimed in claim 44 wherein the monomer (s) is/are deposited on said surface in tracks or lines.

73. (New) A substrate as claimed in claim 69 wherein the chemical composition and/or functionality of the line, track or dot is non-uniform along its length.

74. (New) A substrate as claimed in claim 44 wherein the chemical composition and/or functionality of the line, track or dot is non-uniform in its height.

75. (New) A substrate as claimed in claim 44 wherein the surface comprises non-plasma deposited regions that are comprised of polymerised ethylene-oxide type monomer to provide a non-binding surface.

76. (New) A substrate as claimed in claim 44 wherein the substrate is selected from the group consisting of glass, plastics, nitrocellulose, Poly vinylidene fluoride (PVdF), polycarbonate, poly (methylmethacrylate), nylon, metal, ceramics, quartz, composite structures and silicon wafer.

77. (New) A substrate as claimed in claim 76 wherein the plastic is selected from the group consisting of polyethylene terephthalate, high density polyethylene, low density polyethylene, polyvinyl chloride, polypropylene and polystyrene.

78. (New) A cell culture system comprising a substrate that includes a surface obtainable by depositing on at least part of at least one surface of said substrate a non-uniform plasma polymer surface.

79. (New) A cell culture system comprising a substrate as claimed in claim 44.

80. (New) A cell culture system as claimed in claim 78 wherein the system is part of an assay product.

81. (New) A cell culture system as claimed in claim 80 wherein said assay product is a microarray.

82. (New) A cell culture system as claimed in claim 80 wherein said assay product is a microtitre plate.

83. (New) A cell culture system as claimed in claim 80 wherein said assay product comprises a microfluidic device or a part.

84. (New) A method of screening biological molecules comprising the steps of

i.) preparing a substrate as claimed in claim 44;

ii.) screening the surface of said substrate to determine the binding property of a cell to said surface, wherein said binding property is identifiable by its binding position on said surface; and

iii.) identifying the cell with said binding property.